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APPLIED FORESTRY NOTES

NORTHERN ROCKY MOUNTAIN
FOREST AND RANGE EXPERIMENT STATION
AND
COOPERATING AGENCIES *

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No. 64 June, 1934 Missoula, Montana

AN ECONOMIC TREE CLASSIFICATION FOR PONDEROSA PINE

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BASIS OF CLASSIFICATION

Ponderosa pine trees are quite readily classified according to the predominating grade of lumber produced from the tree. There are a number of factors affecting the quality of lumber produced from a given tree such as; age, position in the stand, size, amount of defect and quality of site. That age exerts the greatest and most uniform influence on grade of lumber produced as has been demonstrated by a recent selective logging study in western Montana. Therefore this factor has been used as the principal basis in the determination of economic tree grades.

This classification is based on the analysis of 231 trees, which is probably not a sufficient number to give results significant of the average stand conditions throughout the Inland Empire. Therefore, they should be considered as preliminary and subject to revision as additional data are gathered. They do, however, constitute an excellent guide for the selection of profitable trees in the stand, and should be of material benefit to lumbermen who desire to practice economic selective logging. Studies have shown that this type of logging more than satisfies that requirement of Article 10 of the Lumber Code which provides for regrowth on cut-over lands.

CLASS 1 - BULL PINE - YOUNG

Age, usually not over 120 years old, but occasionally up to 160 years old; Lumber Production, produce from 50% to 80% of #2 common lumber; Size, seldom over 18 inches d.b.h.; Dunning Tree Class, usually class 1 and 2 and rarely class 4; Branching Habit, dead and green branches usually mixed from breast height to top of first log, mostly green branches from this point and upward.

Trees that are characterized as young bull pine invariably fall in this class. The bark is always dark brown, usually quite deeply grooved, and without pronounced plates. In proportion to their tree volume they produce more #2 common lumber (sometimes a small amount of #1 common) than any other tree class.

CLASS 2 - BULL PINE - OLDER

Age, usually not over 250 years old; Lumber Production, produce from 50% to 80% of #3 common and poorer lumber including #3 shop and inch shop; Size, rarely under 18 inches in size and seldom over 30 inches d.b.h.; Dunning Tree Class, usually class 3 or 4 and sometimes 2; Branching Habit, numerous small to medium-sized dead spike branches persistent on top half or two-thirds of butt log extending up trunk to green branches.

These trees are usually characterized as just coming out of the bull pine stage. The bark is rather dark brown without pronounced plates and usually quite deeply grooved. In general appearance they possess fair to good vigor in spite of the numerous dead spike branches on the lower part of the bole.

CLASS 3 - SHOP TYPE

Age, always mature or overmature over 300 years of age; Lumber Production, yield from 25% to 40% of shop lumber (all grades); with lesser amounts of D and better select; Size, rarely under 26 inches in d.b.h.; Dunning Tree Class, usually class 5 but sometimes class 3 or 4; Branching Habit, large coarse branches, spike or green, sometimes appearing as low as the upper end of first log and spaced to permit manufacture of shop lumber.

The shop type of tree occurs less frequently in the average ponderosa pine stand of western Montana than any of the economic tree grades. The production of select is always less than the shop lumber production, and the yield of #1 and #2 common is always negligible. Three common and poorer lumber sometimes constitutes over 50% of the lumber yield of the tree.

CLASS 4 - SELECT TYPE

Age, usually mature or overmature over 300 years of age, but sometimes includes younger trees grown under highly competitive root and crown competition; Lumber Production, ordinarily produce from 20 to 40% of select lumber (all grades) with lesser amounts of shop lumber; Size, seldom under 20 inches d.b.h. except on poorest sites; Dunning Tree Class, most frequently classes 4 and 5 and sometimes classes 3 and 7; Branching Habit, one to two logs usually surface clear and free from limbs, green and dead spike limbs closely spaced precluding the production of any material amount of shop lumber.

Occasionally overmature suppressed or intermediate trees under 20 inches d.b.h. are included in this class. Likewise a tree containing an excessive amount of hidden defect may be classified as a select tree in error. Three common and poorer lumber frequently constitute 50% or more of the lumber yield of the tree in addition to the select lumber produced.

CLASS 5 - INFERIOR TREES

Age, usually mature or overmature but may be any age; Lumber Production, invariably over 75% of #3 common and poorer with considerable amount of #5 common in defective trees; Size, may be any size; Dunning Tree Class, usually classes 4,

5 and 7 but may be any class.

Utilization of this class of trees for lumber is not profitable. They include four types of trees, excessively defective trees, sound trees of inherently poor quality (club limb), wolf trees and leaning trees. The latter type cannot be definitely considered as always inferior, but results of a recent selective logging study indicate that they are invariably of low quality. Quite frequently excessively defective trees that are nonprofitable contain no outward indications of defect and are very difficult to identify without felling. Therefore, they have not been included in the illustrations that follow.

- - - - - - - - - - -

The Dunning Tree Classes mentioned in the preceding specifications for Economic Tree Classes were developed by Duncan Dunning of the United States Forest Service. Silvicultural characteristics of the individual tree are the basis used in this classification for segregating into groups ponderosa pine trees possessing similar combinations of characteristics. Seven classes of trees are recognized. A detailed description of these tree classes is contained in a reprint entitled "A Tree Classification For The Selection Forests of The Sierra Nevada," Journal of Agricultural Research, Volume 36, Number 9. Copies may be obtained from the Office of Information, United States Department of Agriculture, Washington, D. C.

ILLUSTRATIONS

OF

EACH TREE CLASS

FIG. 1 CLASS 1
YOUNG BULL PINE

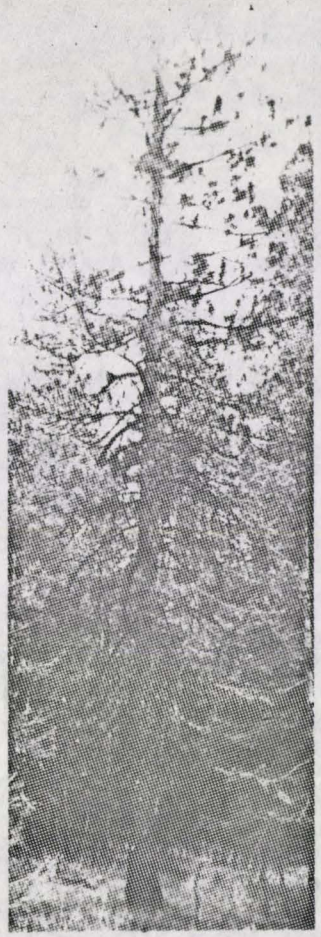

FIG. 2 CLASS 1

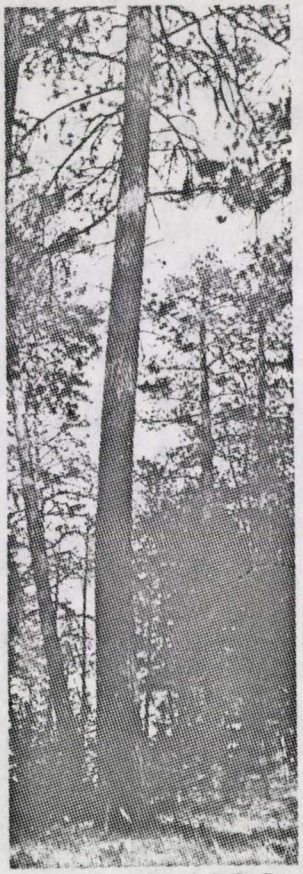

FIG. 3 CLASS 2
OLDER BULL PINE

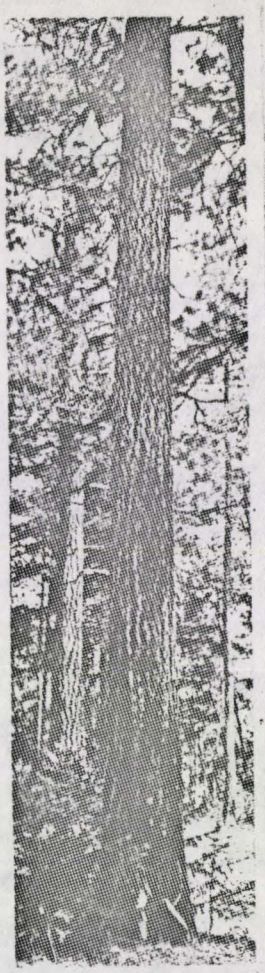

FIG. 4 CLASS 2

PLATE I

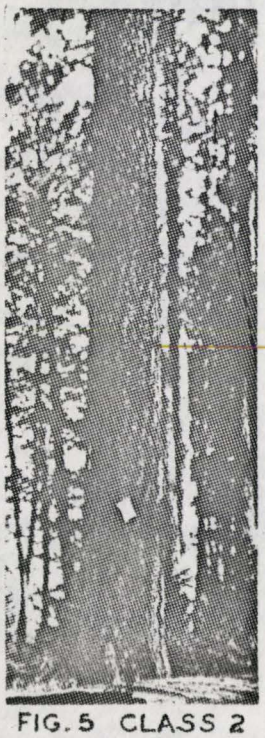

FIG. 5 CLASS 2

FIG. 6 CLASS 2

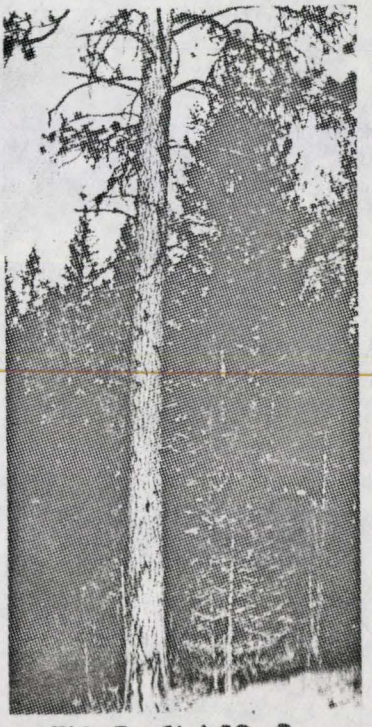

FIG. 7 CLASS 2

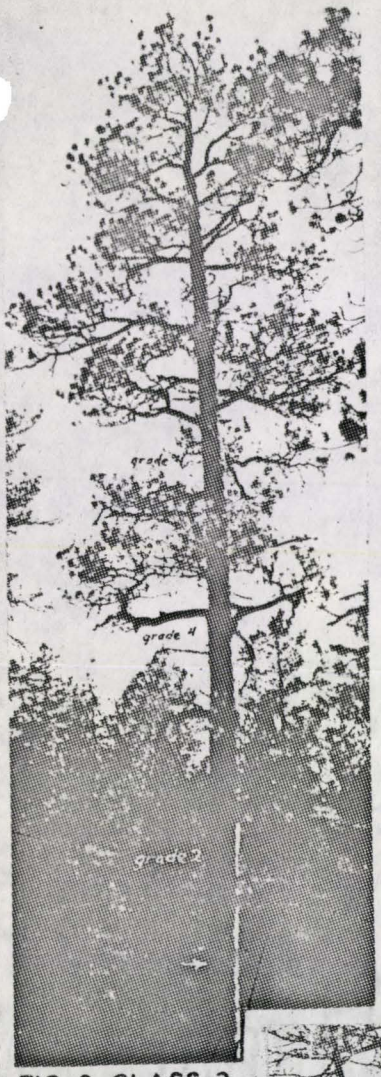

FIG. 8 CLASS 3
SHOP TYPE

FIG. 9 CLASS 3

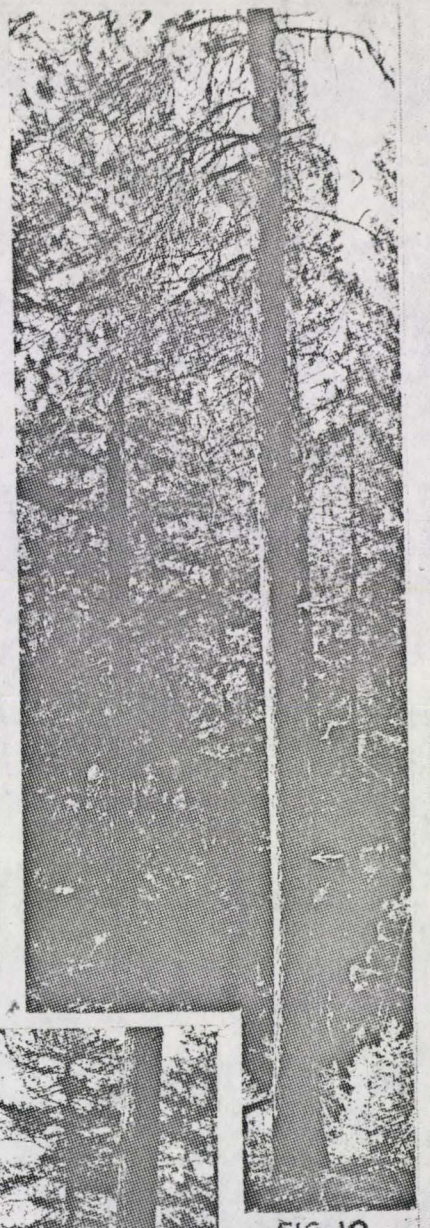

FIG. 10
CLASS 4
SELECT TYPE

PLATE II

FIG. 11 CLASS 3 & 4

PLATE III

FIG. 12 CLASS 5

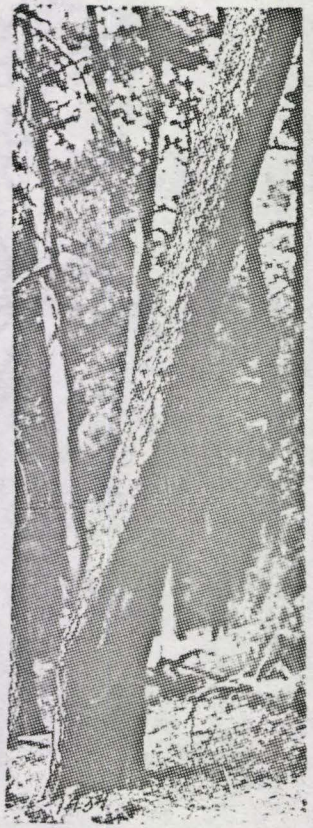

FIG. 13 CLASS 5
LEANER

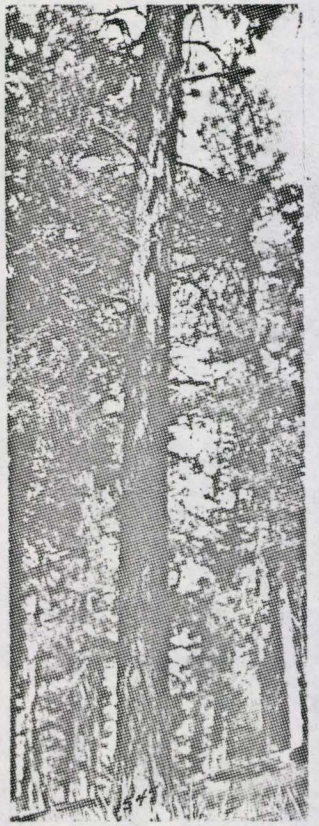

FIG. 14 CLASS 5
CLUB LIMB

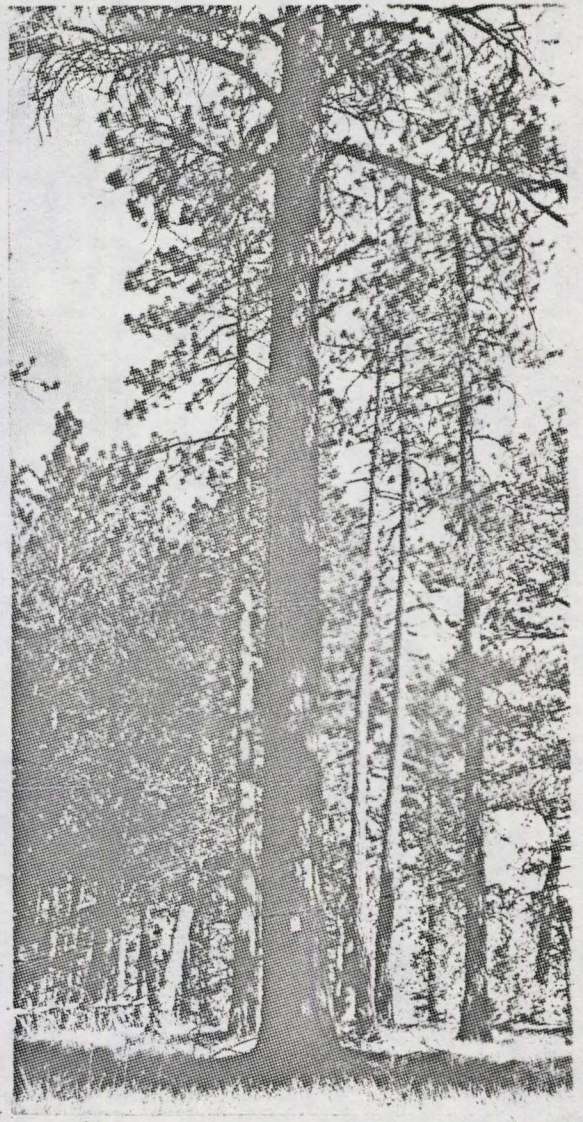

FIG. 15 CLASS 5
CLUB LIMB

FIG. 16 CLASS 5
WOLF TREE

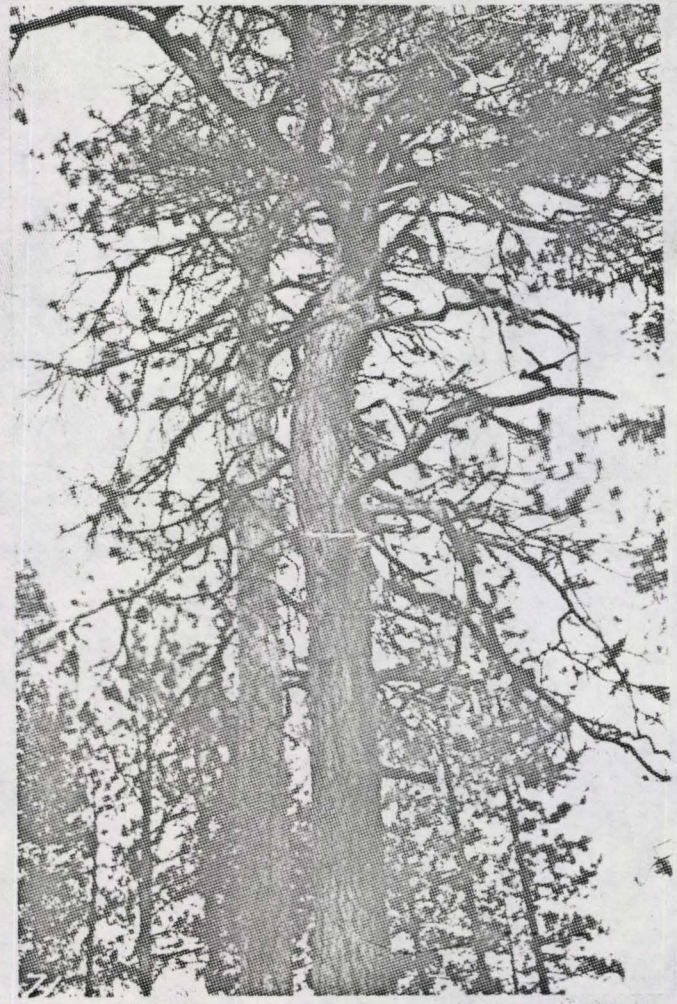

FIG. 17

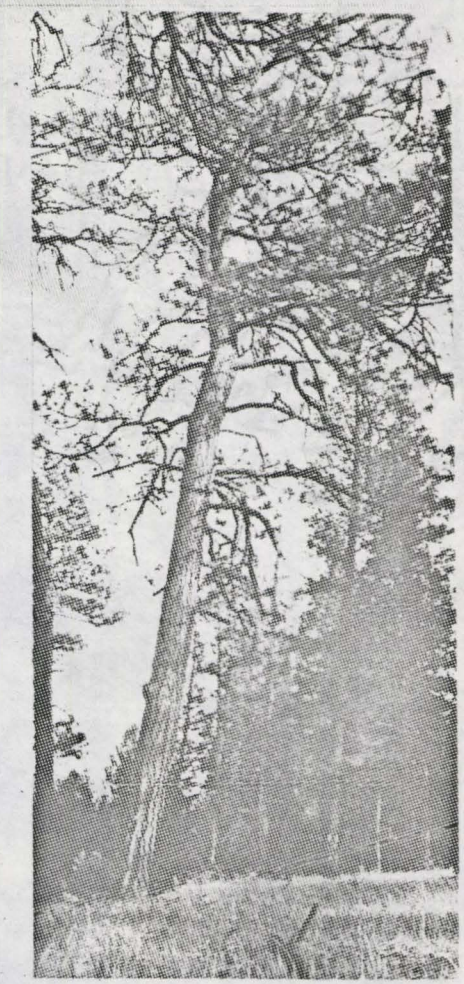

FIG. 18

PLATE IV

NOTES ON TREES SHOWN IN ILLUSTRATIONS

The production costs shown in the following notes were secured from a typical ponderosa pine operation in western Montana. They are as representative of operating costs under the Lumber Code as is possible to obtain at this time. Lumber selling values were obtained by applying Code prices effective January 1, 1934, to a piece tally by grades and sizes of the lumber cut from each tree.

PLATE I

Figure 1

Class 1 tree, bull pine - young.

Age 110 years. D.B.H.[1] 14 inches. Dunning Class #1.
Top Utilization 9 inches.

Production cost per M lumber tally	$25.48	Per tree $3.16
Selling value " " " "	23.83	" " 2.96
Loss " " " "	1.65	" " .20

Log Description			Log Scale Bd. Ft.				Lumber Yield				
Place in Tree	Lgth. Ft.	Grade[2] E.L.A.	Gross	Defect Amt.	Defect Cause[3]	Net	Total in Bd.Ft.	Per Cent by Grades Common 1	2	3	4
Butt	16	3 3	70	10		60	61	0	92	5	3
Top	16	3 3	40	0		40	63	13	81	0	6
All			110	10		100	124	6	87	2	5

Pointed top, codominant, vigor good. Limbs begin at point 5 feet from ground. Bark dark. Length of bole to first dead limb 5 feet, to first green limb 8 feet.

1/ D.B.H. = diameter at breast height.

2/ E = log grade estimated in standing tree, L = log grade assigned at railroad landing, A = actual log grade as determined by lumber yield.

3/ FS = fire scar, HR = heart rot, CK = crook, MP = mass pitch.

Figure 2

Class 1 tree, bull pine - young.

Age 106 years. D.B.H. 17 inches. Dunning Class #1.
Top Utilization 8 inches.

Production cost per M lumber tally	$22.54	Per tree $5.32
Selling value " " " "	19.57	" " 5.05
Loss " " " "	2.97	" " .27

Log Description			Log Scale Bd. Ft.				Lumber Yield				
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total	Per Cent by Grades Select D	Common 2	Common 3	Common 4
Butt	16	3 4	100	0		100	123	3	11	82	4
2nd	16	4 3	70	0		70	95	0	83	17	0
Top	16	4 3	30	0		30	40	0	93	7	0
All			200	0		200	258	1	50	47	2

Dominant, vigor fair, bark dark. Length of bole to first dead branch 4 feet, to first green limb 9 feet. Girdled by porcupine at top d.i.b. of 6".

Figure 3

Class 2 tree, bull pine - older

Age 185 years. D.B.H. 25 inches. Dunning Class #2.
Top Utilization 11 inches.

Production cost per M lumber tally	$18.64	Per tree $11.09
Selling value " " " "	19.30	" " 11.48
Gain " " " "	.66	" " .39

Log Description			Log Scale Bd. Ft.				Lumber Yield					
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades Select C	Select D	Common 2	Common 3	Common 4
Butt	16	3 3 4	180	40		140	210	0	6	6	78	10
2nd	16	3 3 3	160	0		160	171	6	0	32	62	0
3rd	16	3 3 3	110	0		110	127	0	0	61	36	3
Top	14	3 3	50	0		50	87	0	0	51	49	0
All			500	40		460	595	2	2	32	60	4

Dominant, vigor fair, dark bark. Small pin knots 1/2" in diameter beginning at point on bole 3 feet from ground and extending upward.

Figure 4

Close-up view of butt log of tree shown in Figure 3. Note small pin knots responsible for production of 3 common lumber in butt logs of trees in class 2.

Figure 5

Class 2 tree, bull pine - older.

Age 216 years. D.B.H. 23 inches. Dunning Class 4.
Top Utilization 14 inches.

Production cost	per M	lumber tally	$21.83	Per tree	$13.39
Selling value	" "	" "	18.28	" "	11.21
Loss	" "	" "	3.55	" "	2.18

Log Description			Log Scale Bd. Ft.				Lumber Yield						
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades: Select C	Select D	Shop 3&4/4	Common 2	Common 3	Common 4
Butt	16	2 3 4	210	10	FS	200	242	2	22	0	0	74	2
2nd	20	3 3 4	220	20	HR	200	246	0	0	28	0	51	21
Top	16	3 3 4	110	20	HR	90	125	0	2	12	0	65	21
All			540	50		490	613	1	9	14	0	63	13

Dominant, round top, vigor fair, bark faded, grooves not deep, bark beginning to flake taking on almost faded look. Typical small to medium spike knots.

Figure 6

Shows upper part of tree in Figure 5. Note the close branching habit of this tree which indicates why this tree produced 63% of 3 common and 13% of 4 common lumber, or 76% of both.

Figure 7

Class 2 tree, bull pine - older.

Age 235 years. D.B.H. 29 inches. Dunning Class #3.
Top Utilization 17 inches.

Production cost	per M	lumber	tally	$18.41	Per tree	$25.93
Selling value	"	"	"	14.75	"	20.78
Loss	"	"	"	3.66	"	5.15

Log Description			Log Scale Bd. Ft.				Lumber Yield								
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades: Select C	Select D	Shop 2	Shop 3&4/4	Common 2	Common 3	Common 4	Common 5
Butt	16	4 3 4	400	0		400	441	1	9	0	26	0	25	35	4
2nd	16	3 3 3	330	0		330	387	0	4	10	24	21	23	18	0
3rd	16	3 4 4	280	0		280	344	0	0	0	4	32	0	64	0
Top	16	0 4 4	180	0		180	236	0	0	0	3	0	59	38	0
All			1190	0		1190	1408	0	4	3	17	13	24	38	1

Note how persistent and numerous the spike branches are on upper part of butt log. Dominant, vigor fair, bark dark, number of spikes on tree 60. Length of bole to first dead spike 12 feet, to first green limb 39 feet. One-third of stump area showed mass pitch.

PLATE II

Figure 8

Class 3 tree - shop type.

Age 430 years. D.B.H. 33 inches. Dunning Class #5.
Top Utilization 17 inches.

Production cost	per M	lumber	tally	$17.29	Per tree	$26.00
Selling value	"	"	"	24.25	"	36.46
Gain	"	"	"	6.96	"	10.46

Log Description			Log Scale Bd. Ft.				Lumber Yield								
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades: Select B	Select C	Select D	Shop 1&2	Shop 3&4/4	Common 3	Common 4	Common 5
Butt	16	4 1 1	550	50	FS HR	500	394	1	2	27	24	21	12	13	0
2nd	16	1 1 1	500	20	CK	480	461	0	10	16	41	7	9	17	0
3rd	16	3 2 2	330	30		300	275	0	0	2	46	5	33	14	0
4th	12	0 2 4	180	60	HR	120	209	0	1	8	9	10	26	35	11
Top	12	0 4 4	140	30	HR	110	165	0	0	0	0	4	2	94	0
All			1700	190		1510	1504	0	4	13	28	11	11	31	2

Dominant, poor vigor, faded bark, 25 feet to first dead limb and 38 feet to first green limb, fire scar 5 feet up. Coarse limbed and open angular branching habit. The two top logs would not be taken under economic selection. Without these the tree would have yielded 36% of 1&2 shop.

Figure 9

Class 3 tree, shop type.

Age 367 years. D.B.H. 33 inches. Dunning Class #5.
Top Utilization 15 inches.

Production cost per M lumber tally	$17.29	Per tree $39.10
Selling value " " " "	21.47	" " 48.54
Gain " " " "	4.18	" " 9.44

Log Description			Log Scale Bd. Ft.				Lumber Yield							
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades Select C	Select D	Shop 1&2	Shop 3&4/4	Common 2	Common 3	Common 4
Butt	16	1 1 2	580	0		580	607	1	17	33	8	5	30	6
2nd	16	2 1 2	550	0		550	571	1	9	49	8	11	22	0
3rd	16	4 4 4	460	0		460	529	1	2	7	26	0	38	26
4th	16	0 4 4	330	10		320	351	0	1	6	4	0	14	75
Top	16	0 4 4	140	10		130	203	0	0	0	0	0	30	70
All			2060	20		2040	2261	1	7	24	11	4	27	26

Dominant, fair vigor, orange bark, 42 spike limbs. Length of bole to first dead limb 15 feet, to first live limb, 34 feet. Log 3 was a pay log due to its size. Logs 4 and T would be eliminated under economic selection.

Figure 10

Class 4 tree, select type.

Age 345 years. D.B.H. 30 inches. Dunning Class #5.
Top Utilization 16 inches.

Production cost per M lumber tally	$19.71	Per tree $24.30
Selling value " " " "	22.71	" " 28.00
Gain " " " "	3.00	" " 3.70

Log Description			Log Scale Bd. Ft.				Lumber Yield								
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades Select B	Select C	Select D	Shop 1&2	Shop 3&4/4	Common 2	Common 3	Common 4
Butt	16	3 3 1	380	50	FS	330	386	10	27	16	0	4	2	29	12
2nd	16	3 3 3	300	0		300	354	0	5	16	8	10	5	37	19
3rd	14	3 3 4	210	0		210	259	0	0	0	7	5	0	45	43
Top	18	4 4 3	200	0		200	234	0	2	0	0	0	0	58	40
All			1090	50		1040	1233	3	10	10	4	5	2	42	24

Dominant, fair vigor, round top. Mass pitch 25% of stump area. Bark bright orange, narrow plates, moderately deep grooves. Length of bole to first dead and green limb 17 feet and 48 feet. Three and one-half-foot fire scar. Branches small, crown wide and medium long.

Figure 11

Class 4 tree, select type.
Tree number 330, extreme right of group.

Age 262 years. D.B.H. 21 inches. Dunning Class #7.
Top Utilization 12 inches.

Production cost per M lumber tally	$20.17	Per tree	$ 9.64
Selling value " " " "	25.50	" "	12.19
Gain " " " "	5.33	" "	2.55

Log Description			Log Scale Bd. Ft.				Lumber Yield						
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades: Select C	Select D	Shop 3&4/4	Common 2	Common 3	Common 4
Butt	16	1 1 1	160	0		160	193	20	19	1	27	33	0
2nd	16	1 1 1	140	0		140	168	12	34	2	26	24	2
Top	16	4 4	80	20		60	117	0	0	0	0	73	27
All			380	20		360	478	12	20	1	20	40	7

Intermediate, flat top, fair vigor, only 6 spike limbs on tree. Length of bole to first dead limb 33 feet, to first green limb 33 feet. A good example of a tree that was pruned early in life, surrounded by 5-log trees.

Figure 11

Class 4 tree, shop type.
Tree number 357 or card 4.

Age 280 years. D.B.H. 31 inches. Dunning Class #5.
Top Utilization 19 inches.

Production cost per M lumber tally	$17.64	Per tree	$34.76
Selling value " " " "	23.78	" "	46.86
Gain " " " "	6.14	" "	12.10

Log Description			Log Scale Bd. Ft.				Lumber Yield							
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades: Select C	Select D	Shop 1&2	Shop 3&4/4	Common 2	Common 3	Common 4
Butt	16	1 1 1	550	0		550	522	16	28	0	14	6	27	9
2nd	16	1 1 2	500	0		500	492	9	9	24	7	7	41	3
3rd	16	2 1 2	400	0		400	453	0	15	33	6	3	25	18
4th	14	4 2 4	270	0		270	293	0	4	0	27	0	49	20
Top	12	4 4	180	0		180	211	0	0	0	10	0	54	36
All			1900	0		1900	1971	7	13	14	12	4	36	14

Dominant, poor vigor, orange bark, 10 spike limbs. Length of bole to first dead limb 10 feet, to first live limb 45 feet. Note wide spacing of spike branches on 2nd log necessary for production of shop lumber. Log No. 4 in this tree was a pay log on account of its size. A fair example of a shop tree.

PLATE III

Figure 12

Class 5 tree, inferior, "leaner."

Age 325 years. D.B.H. 20 inches. Dunning Class #4.
Top Utilization 9 inches.

Production cost	per	M	lumber	tally	$20.51	Per	tree	$8.47
Selling value	"	"	"	"	13.87	"	"	5.73
Loss	"	"	"	"	6.64	"	"	2.74

Log Description			Log Scale Bd. Ft.				Lumber Yield						
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades: Select C	Select D	Common 2	Common 3	Common 4	Common 5
Butt	16	4 4	180	120	HR	60	156	0	8	4	6	82	0
2nd	16	4 4	160	120	HR	40	85	0	0	0	0	68	32
3rd	16	4 4	100	880	HR	20	125	4	0	0	2	35	59
Top	14	4 4	30	20	HR	10	47	0	0	11	89	0	0
All			470	340		130	413	1	3	3	13	56	24

Codominant, fair vigor, dark colored bark. Leans badly for no apparent reason. No fire scar evident at butt. Length of bole to first dead limb 7 feet, to first green limb 35 feet. Ten-and 12-foot lumber cut from top log to eliminate defect.

Figure 13

Class 5 tree, inferior, "leaner."

Age ? . D.B.H. 25 inches. Dunning Class #5.
Top Utilization 14 inches.

This tree was skidded to the landing, bucked to three 14-foot logs and discarded as a cull. It leaned 40° uphill from vertical. The butt was badly fire scarred and crooked and the bole twisted and distorted, indicating spiral grain. The fire scar extended 8 feet up the butt log.

Figure 14

Class 5 tree, inferior "club limb."

Age 289 years. D.B.H. 24 inches. Dunning Class #3.
Top Utilization 13 inches.

Production cost per M lumber tally	$21.18	Per tree $19.92
Selling value " " " "	18.17	" " 17.10
Loss " " " "	3.01	" " 2.82

Log Description			Log Scale Bd. Ft.				Lumber Yield					
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades Select D	Shop 3&4/4	Common 2	Common 3	Common 4
Butt	16	1 4	280	0		280	312	3	14	15	64	4
2nd	16	4 4	210	0		210	266	0	4	6	60	30
3rd	16	4 4	180	0		180	207	0	4	24	46	26
Top	16	4 4	100	0		100	156	0	0	17	60	23
All			770	0		770	941	1	7	15	58	19

Originally reserved for seed tree, but cut by mistake by sawyers. Horn limbs from upper half of butt log and upward. Length of bole to first dead and green limb 8 feet and 22 feet, respectively. Crown was dominant and showed good vigor.

Figure 15

Class 5 tree, inferior "club limb."

Age 273 years. D.B.H. 28 inches. Dunning Class #5.
Top Utilization 22 inches.

Production cost per M lumber tally	$20.78	Per tree $18.11
Selling value " " " "	17.39	" " 15.16
Loss " " " "	3.39	" " 2.95

Log Description			Log Scale Bd. Ft.				Lumber Yield					
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades Select C	Select D	Shop 2 4/4	Common 3	Common 4
Butt	16	2 3 4	380	20	FS	360	402	1	5	15 14	9	56
2nd	20	4 4 4	420	0		420	470	1	3	7 26	37	26
All			800	20		780	872	1	4	11 20	24	40

Note persistent spike limbs. Length of bole to first dead spike 4 feet, to first green limb 37 feet. Dominant, poor vigor, orange bark and 40 spike limbs on tree.

PLATE IV

Figure 16

Class 5 tree, inferior, "wolf."

Age 316 years. D.B.H. 36 inches. Dunning Class #5.
Top Utilization 29 inches.

Production cost	per	M	lumber	tally	$21.36	Per	tree	$16.83
Selling value	"	"	"	"	17.06	"	"	13.44
Loss	"	"	"	"	4.30	"	"	3.39

Log Description			Log Scale Bd. Ft.				Lumber Yield					
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades Select C	Select D	Shop 3&4/4	Common 3	Common 4
Butt	20	1 1 4	790	80	MP FS	710	788	2	5	10	29	54

Typical overmature stage of wolf tree. Stump contained 80% mass pitch. Considered very questionable at time of cutting but taken to see what it would produce. Dominant, poor vigor, orange bark, 40 spike limbs, 10 feet to lowest dead limb and 36 feet to lowest green limb. Cut 93% of 3 common and poorer.

Figure 17

This illustration shows a deformed tree that was questionable from a utilization standpoint.

Age 420 years. D.B.H. 29 inches. Dunning Class #5.
Top Utilization 24 inches.

Production cost	per	M	lumber	tally	$20.45	Per	tree	$13.50
Selling value	"	"	"	"	26.00	"	"	17.15
Gain	"	"	"	"	5.55	"	"	3.65

Log Description			Log Scale Bd. Ft.				Lumber Yield						
Place in Tree	Lgth. Ft.	Grade E.L.A.	Gross	Defect Amt.	Defect Cause	Net	Total in Bd.Ft.	Per Cent by Grades Select B	Select C	Select D	Shop 1&2	Shop 3&4/4	Common 3	Common 4
Butt	12	1 1 1	340	40	HR CK	300	340	5	11	34	4	0	31	15
Top	12	2 1 2	300	20	MP CK	280	320	0	0	3	27	15	11	44
All			640	60		580	660	2	6	19	15	8	21	29

Originally figured to cut one log. When felled it was decided to cut two 12-foot logs. Line indicates where top cut came. Codominant, poor vigor, orange bark and 20 spike limbs. Carbuncle on side of trunk. Lumber contained considerable compression wood. Length of bole to first dead and green limb was 16 feet and 29 feet, respectively.

Figure 18

This shows detail of branch arrangement at the top of the second log of the tree in Figure 17. Note the knot arrangement of the second log that was responsible for the production of 27% of 1&2 shop lumber.